UNITED STATES PATENT AND TRADEMARK OFFICE

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EXAMINER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>22 June 2009</u>.

2a) ☐ This action is FINAL.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-10 and 12-20</u> is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-10,12-20</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

2.   Claims 1- 10, 12-14, 18, 19 and 20 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Cok (US Patent # 5,040,064) in view of AAPA and in further view of Schrock

(US Patent # 5,105,276).

[Claims 1 and 20]

Cok teaches Apparatus for compensating image signals produced by a CCD imager for smears,

the CCD imager including (col. 1 lines 14-45), the apparatus comprising: an image data analyzer

for detecting the boundaries of a smear (col. 3 line 47-col. 4 line 20); and an image data replacer

for replacing data between the boundaries of a detected smear with alternative image data (col. 5

line 3-35), wherein the image data analyzer is arranged to detect the boundaries of smears

produced by incomplete charge transfer (col. 3 lines 2-15 teach incomplete scanning which leads

to incomplete charge transfer). Cok fails to teach a multiplication register for multiplying charge

produced by the CCD imager wherein the image data analyzer is arranged to detect the

boundaries of horizontal smears produced by incomplete charge transfer in the multiplication

register. However AAPA teaches a multiplication register for multiplying charge produced by

the CCD imager wherein the image data analyzer is arranged to detect the boundaries of

horizontal smears produced by incomplete charge transfer in the multiplication register (Page 1).

Therefore taking the combined teachings of Cok and AAPA, it would be obvious to one skilled

in the art to have been motivated to have used a multiplication register for multiplying charge

produced by the CCD imager wherein the image data analyzer is arranged to detect the

boundaries of horizontal smears produced by incomplete charge transfer in the multiplication

register as taught in AAPA to be used in the system of Cok to remove the smearing between

edges so as to get a better image. Cok in view of AAPA fails to teach a subtractor for subtracting

a signal corresponding to the charge accumulated during the transfer mode and transferred to the

output register as lines corresponding to the at least one masked row, from the line signals

corresponding to the rows of the image area and mode to produce line signals, at least one row of

pixels being masked from incident radiation arranged on the side of the image area opposite the

output register. However Schrock teaches a subtractor (figure 5, 55) that subtracts dark current

from the ccd's image signals wherein the dark current is generated by the shielded pixels 43 (col.

3 lines 29-49, figures 5 and 6). Therefore taking the combined teachings of Cok, AAPA and

Schrock, it would be obvious to one skilled in the art at the time of the invention to have been

motivated to have a subtractor for subtracting a signal corresponding to the charge accumulated

during the transfer mode and transferred to the output register as lines corresponding to the at

least one masked row, from the line signals corresponding to the rows of the image area and

mode to produce line signals, at least one row of pixels being masked from incident radiation

arranged on the side of the image area opposite the output register in order to generate an image

that is free of dark current.

[Claim 2]

Cok teaches wherein the image data analyzer comprises means for detecting the boundaries of a smear by detecting rates of change in the image data greater than a predefined limit (col. 5 lines 3-22, figure 5).

[Claim 3]

Cok teaches wherein the alternative image data is derived from image pixels neighboring the detected smear (col. 5 lines 23-35).

[Claim 4]

Cok teaches wherein the alternative image data is derived by interpolation of image data (col. 5 lines 23-35).

[Claim 5]

Cok teaches wherein the image data analyzer analyses the image line by line to detect intensity gradients greater than the predefined limit (See figure 2 wherein edges are defined for first line and for a particular region comprising lines).

[Claim 6]

Cok teaches wherein the image data analyzer comprises a kernel for analyzing a portion of the image data at a time (See figure 2, col. 3 lines 16-57).

[Claim 7]

Cok teaches wherein the kernel has a sliding window to define the portion of the image being analyzed by the kernel and moveable across the image to analyze the complete image (See figure 2, col. 3 lines 16-57).

[Claim 8]

Cok teaches comprising a temporal integrator for integrating at least two images acquired by the

CCD imager prior to boundary detection by the image data analyzer (col. 2 lines 61-68 teach a

video camera which takes plurality of frames per second).

[Claim 9]

Cok teaches extracting lines or two dimensional regions as shown in figure 2. It is noted that this

comprises extracting the coordinates of the smear boundaries and providing the extracted

coordinates to the image data replacer.

[Claim 10]

AAPA teaches wherein the image data analyzer detects the boundaries of vertical smears

produced on transfer of image data from pixels of the CCD imager (Page 2).

[Claim 12]

Schrock teaches wherein the CCD imager further comprises a store arranged between the image

area and the output register (col. 4 lines 7-18).

[Claim 13]

Schrock teaches wherein the CCD sensor comprises a plurality of masked rows (fig. 6).

[Claim 14]

Schrock teaches wherein a line signal is generated corresponding to each masked row and the

error signal is generated from an average of the masked row line signals (col. 1 lines 44-52).

[Claim 18]

A CCD imaging apparatus comprising apparatus according to claims 1 (col. 1 lines 14-28)

[Claim 19]

A CCD camera comprising a CCD imager and apparatus according to claim 1 (col. 1 lines 14-28).

3.   Claims 15-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cok (US Patent # 5,040,064), AAPA, Schrock (US Patent # 5,105,276) and further in view of Thaler (US Patent # 6,313,883).

[Claims 15-17]

Cok in view of AAPA fails to teach comprising a gain controller for varying the gain of the multiplication register for selected images or portions of images, wherein the gain is adjusted to be relatively high and relatively low on alternate lines of the image. However Thaler teaches a gain The regional control memory unit 22 comprises a memory unit in which are stored one or more region selection control tables for generating gain table select command signals that are used to selectively access the gain tables stored in storage unit 24, whereby to vary application of the gain (boost) factors that are applied to multiplier 26 on a pixel-to pixel basis and thereby to vary the enhancing effect of processing system 4 on selected portions of the image represented by luminance signal Y and chrominance signal C. The region selection control 23 is adapted to respond to operator inputs to modify operation of signal processing system 4 by selecting specific regional tables from memory unit 22, so as to vary the area of the observed image that is to be enhanced and/or vary the degree of enhancement. Fig. 4d also shows a gain table with different gains for different lines of image (col. 3 lines 54-67). Therefore taking the combined teachings of Cok, AAPA in view of Thaler, it would be obvious to one skilled in the art at the time of the invention to have been motivated to have a gain controller for varying the gain of the multiplication register for selected images or portions of images, wherein the gain is adjusted to

be relatively high and relatively low on alternate lines of the image so as to vary the area of the observed image that is to be enhanced and/or vary the degree of enhancement.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to YOGESH K. AGGARWAL whose telephone number is (571)272-7360. The examiner can normally be reached on M-F 9:00AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (571)-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Yogesh K Aggarwal/
Examiner, Art Unit 2622